Math 135 - section 01 - Precalculus Diagnostic Quiz Solutions
August 30, 2013

1. Let $f(x) = x^2 - x$ and $g(x) = x + 1$. Which function is $f(g(x))$?

   A. $x^2 - x$ B. $x^2 + 3x$ C. $x^2 + x$ D. $x^2 + x + 2$

   Solution: $f(g(x)) = (x+1)^2 - (x+1) = x^2 + 2x + 1 - x - 1 = x^2 + x$. This is C.

2. Find common factors and cancel to simplify: $\dfrac{12x}{3x-6} \cdot \dfrac{x^2-4}{2x+4}$

   A. $\dfrac{x^2+12x-4}{5x-2}$ B. $2x$ C. $-\dfrac{4}{3}(x-1)$ D. $\dfrac{12x^3-48x}{6x^2-12}$

   Solution: Since $x^2 - 4 = (x-2)(x+2)$, $2x+4 = 2(x+2)$, and $3x - 6 = 3(x-2)$, after cancelling all common factors, what is left is $2x$. The correct answer is B.

3. Which is equal to $\left(u^{-5}v^2\right)^3 \left(\dfrac{v^2}{u}\right)^{-1}$?

   A. $u^{-16}v^8$ B. $u^{-14}v^4$ C. $u^{-9}v^3$ D. $(uv)^{-7}$

1. *Solution:* $\left(u^{-5}v^2\right)^3 = u^{-15}v^6$ and $\left(\frac{v^2}{u}\right)^{-1} = uv^{-2}$. So adding exponents, we see this is B: $u^{-14}v^4$.

4. If $f(x) = 5x^2 - 11$, what is $f(a+1) - f(a)$?

   Solution: $f(a+1) - f(a) = 5(a+1)^2 - 11 - (5a^2 - 11) = 10a + 5$

5. Find all values of x satisfying $2(x-2) > 5$.

   Solution: This is the same as $2x > 5 + 4 = 9$, so all $x > 9/2$ are solutions.

6. Solve for x: $2x^2 - x - 6 = 0$ (find all solutions).

   Solution: The quadratic equation factors as $(2x+3)(x-2) = 0$, so the solutions are $x = -\frac{3}{2}$ and $x = 2$.